Section 2. Description of Simpson's Timber Operations and Forest Management Activities

2.1 INTRODUCTION

This Section describes Simpson's timber operations and related land management activities in the Initial Plan Area under four headings:

- Timber-Product Harvest
- Silvicultural Regimes and Methods
- Timber Stand Regeneration and Improvement
- Minor Forest-Product Harvest

The activities described in this section (as well as those activities need to carry out all the measures identified in Section 6) will be covered by the authorizations for incidental take of Covered Species and be subject to the applicable provisions of the Operating Conservation Program in this Plan.

2.2 TIMBER-PRODUCT HARVEST

Timber-product harvest includes activities necessary to the logging (i.e. felling, yarding, and loading), salvage, and transport of timber products. Such activities are described below under the following headings:

- Felling and bucking timber
- Yarding timber
- Loading and other landing operations
- Salvaging timber products
- Transporting timber and rock products
- Road construction and maintenance
- Rock pit construction and use
- Water drafting for dust abatement and fire suppression
- Equipment maintenance

Methods used to harvest timber products are described in Section 2.3.

2.2.1 Felling and Bucking Timber

Timber felling is the necessary first step in any logging operation, and usually includes "bucking", or cutting of the felled tree into predetermined log lengths that are specified by the timber owner to maximize the value of the tree. Felling and bucking are generally done with chain saws by independent contractors who work in pairs ("sets"). On terrain

that is not too steep, mechanical felling machines (feller-bunchers) can be used. These machines are structurally similar to tracked excavators and have an articulated attachment that grabs the tree, cuts it, and then places it in a pile with other trees to facilitate subsequent skidding of "bunched" stems to the log landing. More complex feller-bunchers have "processor heads" that will delimb the tree and buck it into logs. Tracked undercarriages and the self-leveling mechanisms configured on some of these machines allow them to operate on moderate slopes. Feller-bunchers have no blade or other attachment capable of moving soil.

2.2.2 Yarding Timber

Yarding, also referred to as skidding, is the movement of logs from the stump to the log landing. There are three major classifications of yarding systems; ground based, cable, and aerial logging

2.2.2.1 Ground-Based Yarding

Ground based logging usually involves the use of tractors, either tracked or rubber tired (rubber tired skidders) to skid logs to the landing. These machines use either powered grapple attachments or winch lines to grasp of the log, and require constructed "skid trails" for their operation on all but the mildest terrain. A related system used only with small logs and on the mildest terrain is forwarder logging, where a specialized tractor equipped with a small hydraulic boom loader travels into the logging unit and loads logs onto bunks that are mounted on a rearward extension of the tractor's frame - in essence a small self-loading truck designed with tires, gearing, and ground clearance that allow it to operate off-road.

Another variant on ground skidding is shovel logging. A shovel, or hydraulic boom log loader, is an excavator that has been equipped with a log loading boom and grapple instead of an excavator boom and bucket. Most shovels are mounted on tracked undercarriages with generous ground clearance, providing some degree of off-road mobility. This capability is used in shovel logging, where a shovel walks off the truck road, picks up logs in a unit that has been felled, and passes them back towards the truck road using its upper structure rotation or "swing" function. This system is very efficient over short distances, since the same machine that does the yarding can load the logs on trucks. However, it is not used over long distances because of the amount of repeated log handling that becomes necessary as distance from the truck road increases. As with feller-bunchers, shovels have no blade or other attachment capable of moving soil and do not require the construction of roads or trails to operate.

2.2.2.2 Cable Yarding

Cable yarding involves the use of steel cables, or wire ropes, to skid logs to a truck road or log landing using a yarder that is set up on the truck road or landing. A yarder has a number of powered drums filled with wire rope, and a vertical tower or leaning boom that is necessary to elevate or provide lift to the cables as they leave the machine. The tower ("pole") or boom that provides this lift is held in position by three to eight wire rope guylines that are also stored on powered drums on the machine. With rare exception, logs are yarded uphill with cable systems.

Cable yarding is usually described as either "high lead" or "skyline", depending on how much lift is applied to logs as they are yarded. High lead logging essentially attaches logs directly to the end of the "mainline" that exits the top of the yarder tower. The only lift provided is that resulting from the difference in elevation between the location of the log and the top of the tower. This system is quick to set up and is effective over short distances (generally less than 500') where, depending on terrain and tower height, the resulting lift will be sufficient to prevent the logs from digging into the soil surface during yarding.

Over longer reaches some form of skyline logging is preferred to provide lift sufficient to increase productivity (reduced drag over long distances significantly increases yarding speed) and minimize ground disturbance. Skyline logging involves use of a skyline cable that extends from the top of the tower to an anchor located at some elevated point beyond the edge of the logging area. This anchor is usually a stump on an opposing hill slope, but can be a suitable tree at the perimeter of the logging unit that has been climbed and rigged to provide the necessary elevation for the skyline. Logs are attached to a carriage that rides on the skyline, and the carriage is pulled to the landing with the yarder's mainline (also referred to as the skidding line in this application). Depending on which variant of skyline logging is used, the skyline can be lowered to attach the logs and then raised to provide lift, or the carriage can spool out its own skidding line through one of various mechanisms and then lift the logs towards the skyline. Either way, enough lift is provided to suspend the uphill end of logs above the ground surface unless an unusually large log is encountered or the only available skyline anchor point cannot provide enough lift.

2.2.2.3 Aerial Yarding

Aerial yarding (e.g., by helicopter or balloons) is used where roads cannot be constructed to provide access to a harvesting unit for conventional (ground based or cable) yarding systems. Steep and/or unstable terrain is usually the reasons for the decision to use aerial methods, although lack of a road right-of-way may also trigger its use. Aerial logging uses cables or grapples suspended from long cables to pick up logs and hold them for transport to the landing. The logs are lowered to the log loading area and released without the aerial equipment landing. This type of yarding generates virtually no soil disturbance. However, a large landing is required to safely accommodate concurrent landing of logs, truck loading operations, and decking of logs generated during peak production hours. A separate service landing is also needed to provide a clean, rocked, debris and dust-free surface to protect the helicopter’s engines from damage. The disadvantages of helicopter logging are its expense (roughly three times more expensive than cable yarding) and the fact that lack of vehicular access to the area compromises the landowner's ability to accomplish site preparation, reforestation, and other forest management activities in the future. Helicopter service landing areas are appurtenant to the THP area.

2.2.2.4 Loading and Other Landing Operations

After logs are yarded to a landing or roadside they may need some additional saw work to remove limbs, to buck overly long pieces into shorter segments, or to remove breakage. These tasks are either accomplished with hand labor or with a mechanical delimber, a tracked machine similar to an excavator that has a long boom and moving cutting head that delimbs logs, and that can also accurately measure and buck a tree-

length piece into logs. Logs are next loaded onto log trucks using a shovel or front-end loader (a wheeled bucket loader equipped with log loading forks instead of a bucket). Shovels (or heel-boom loaders) can operate on small landings or, if sideslopes are suitable, they can deck logs on the roadside and load trucks without leaving the road grade. In contrast, front-end loaders have a longer turning radius and require larger landings.

2.2.3 Salvaging Timber Products

Dead, dying, and windthrown trees are periodically salvaged. . This salvage is primarily related to road maintenance or fire damage resulting from prescribed burns. Dead or dying trees are removed from along roads if they can be easily salvaged and yarded onto an adjacent road. Salvage of timber products is conducted through the annual filing of a property wide Exempt Notice (i.e. subject to the FPRs but exempt from THP requirements) and THP processes. Removal of these products requires a licensed timber operator. If the volume to be salvaged exceeds 10% of the average existing timber volume per acre, a THP is required.

2.2.4 Transporting Timber and Rock Products

Timber and rock materials are most commonly transported along roads via truck and trailer. Helicopters may occasionally but infrequently be used to transport logs directly to the sawmills.

2.2.5 Road Construction and Maintenance

Roads on lands owned in fee by Simpson are constructed most commonly by felling and yarding timber along a predetermined road alignment that has been designated on the ground. This activity is followed by excavating or filling hillslope areas, using tractors or excavators. Road construction also commonly involves construction of watercourse crossings which use culverts, bridges, and occasionally fords. Roads also include vehicle turnouts and log landings, which are wide spots capable of being used as destinations of yarded logs as well as locations for loading logs onto trucks. Road construction may also involve the surfacing of soil roads with rock, lignin, pavement, or other surface treatments approved by NMFS and USFWS.

Road maintenance commonly includes surface grading, clearing bank slumps, repairing slumping or sliding fills, clearing ditches, repairing or replacing culverts and bridges, adding surface material, dust abatement, and installing or replacing of surface drainage structures. Road maintenance for fire prevention, public access, and timber management may include mechanical control of roadside vegetation. Mechanical control may include grading, hand cutting or pulling, use of a "brush buster"-type mechanical device, burning, steaming, other experimental methods, etc.

2.2.6 Rock Pit Construction and Use

Rock pits, also referred to as borrow pits, are locations where rock is excavated, crushed, blasted, or otherwise produced for eventual use as a road surface, road fill, or rock bank stabilization materials. Activities associated with the use of rock pits also include loading rock into trucks for hauling, hauling of mined rock, and the construction and maintenance of rock pit access roads (see above).

2.2.7 Water Drafting for Dust Abatement and Fire Suppression

Water drafting involves the direct drafting of stream flow into a water truck which is then periodically sprinkled or otherwise applied to road surfaces to minimize dust production and help maintain a hard, compact surface. Water may also be obtained by the use of gravity fed systems that provide water directly to storage reservoirs or tanks for later use in dust abatement of fire suppression. Occasionally, existing drafting locations within or adjacent to watercourses are excavated and cleaned of debris to increase their in-channel storage area for drafting purposes.

2.2.8 Equipment Maintenance

The use of falling, yarding, loading, trucking, and road maintenance equipment requires equipment fueling and maintenance. This maintenance generally occurs on or adjacent to roads and landings.

2.3 SILVICULTURAL REGIMES AND METHODS

Simpson's silvicultural practices are designed to enhance the productivity of its timberlands by ensuring both prompt regeneration of harvested areas and rapid forest growth. Treatments vary by stand age, stand condition, site class, and species composition, and not all treatments are applied to every site. Table 2-1 summarizes the treatments, in approximate chronological order, that are considered as part of Simpson's forest management regime.

Table 2-1. Simpson's forest management regime.

Treatment	Stand Age
Regeneration Harvest	50 and older
Site preparation	0 – 1
Planting	1
Vegetation Management	0 – 10
Pre-commercial thinning	10 – 20
Commercial Thinning	35 – 45

Silvicultural activity involves the specific methods by which a forest stand or area is harvested and regenerated over time to achieve the desired management objectives. Typical management objectives include achieving maximum sustained yield, and the maintenance, alteration, or creation of habitat. Specific examples of silvicultural activity include silvicultural methods such as individual (single) tree selection, group selection, seed tree, shelterwood, and clearcut.

2.4 TIMBER STAND REGENERATION AND IMPROVEMENT

Timber stand regeneration and improvement includes activities necessary to establish, grow, and achieve the desired species composition, spacing, and rate of growth of young forest stands. Such activities include:

- Site preparation, prescribed burning, and slash treatment
- Tree planting

- Control of competing vegetation
- Precommercial thinning and pruning

Simpson manages timber in the Initial Plan Area under a Maximum Sustained Production (MSP) plan prepared and approved in accordance with state law. Under the MSP plan, annual harvest levels are carefully scheduled to balance forest growth and timber harvest over a 100-year period and to achieve maximum sustained production of high quality timber products while protecting resource values such as water quality and wildlife. Stands are considered ready for harvest once they enter the 50-year age class. However, state laws that constrain both the size of even-aged management units and the timing of adjacent even-age harvesting operations can delay the harvest of many stands until they reach the 70 year age class. The estimated average age of stands harvested is expected to be around 55 years as the property approaches full regulation.

With the exceptions noted below, Simpson plans to practice even-aged management in the Plan Area, using clear-cutting as the harvest/regeneration method. Clearcutting provides for prompt regeneration of redwood and Douglas-fir, the principal commercial tree species in these forests, and maintains these trees in a "free-to-grow" state that is not compromised by competition with a residual overstory of older trees or by the possibility of damage from the repeated site disturbance that is implicit in the application of other silvicultural systems. The growth potential inherent in the use of clearcutting in these forest types was assumed in the calculation of yields for Simpson's sustained yield (Option A document).

The primary exceptions to clearcutting will occur in the following situations:

- Areas where past use of selection or seed tree logging has left residual mature timber that will be harvested in "seed tree removal" or "overstory removal" operations.

- Areas where buffers along public roads or near urban development are harvested using the shelterwood or selection systems so that the visual impact of timber harvesting is ameliorated.

- Overly steepened or unstable slopes where slope stability concerns take precedence over forest productivity.

- Riparian Management Zones (RMZs), Habitat Retention Areas (HRAs), or other areas managed principally for fish and wildlife habitat.

Clearcut management units will continue to reflect the provisions of Simpson's NSO HCP, principally through the retention of wildlife trees that are left within marked tree clumps or designated habitat retention areas to provide residual vertical structure. These retained trees, in conjunction with those left in RMZs, will result in a significant portion of the area within even-aged harvesting units supporting post-harvest vertical structure to provide various habitat attributes for terrestrial and aquatic wildlife.

Since essentially all of Simpson's property has been harvested at some time in the past, the progress of timber harvesting across the ownership will always reflect to some extent the pattern of age classes imprinted on the landscape by the timing of prior logging activity. In areas where large ownership blocks were initially harvested in more or less

continuous logging operations during the railroad logging era (pre-WWII), ensuing harvesting operations will be more concentrated, although FPR constraints will result in dispersal of activities within these blocks during subsequent rotation periods.

This pattern of timber harvesting was changed by decades of selective logging throughout the redwood region during the middle of the past century, and by the eventual acquisition by Simpson of a patchwork of properties that reflected differing harvest schedules and treatments by prior owners. Future harvesting cycles in these areas will see timber operations that are more dispersed due to their varied management histories.

The effects of the timing of past harvesting activity are reflected in Table 2-2, which shows the age classes of Simpson's ownership within the 11 HPAs when the Plan was prepared. As indicated in Table 2-2, this acreage is dominated by forests types less than 60 years old, with 80% of the area supporting forests in these age classes. Fifteen percent of the area is in forest types 60 years old or older, and the proportion of the area in these older age classes is expected to remain at this level or increase over the life of the Plan for two reasons:

1. FPR adjacency constraints that are applied to even-aged harvesting units result in retention of many stands far past planned rotation age. If harvesting of a tract of mature timber is initiated around age 50, the harvesting of much of that tract will be constrained into the following decade, and the harvest of a few stands will be constrained past 70 years of age. This effect has been demonstrated in Simpson's long term operating plan.

2. Current rules and regulations, interacting with provisions of the NSO HCP, result in harvesting restraints or prohibitions on approximately 12% of the Initial Plan Area. Provisions of the AHCP/CCAA will add to the area subject to such restrictions. Trees in these areas will be retained at least through Plan period and will thus add to the total acreage in older age classes.

2.4.1 Site Preparation, Prescribed Burning, and Slash Treatment

Site preparation may be required where accumulations of slash following timber harvesting constitute a physical barrier to effective planting, or where weed species (brush or non-merchantable trees) remaining on the site would comprise severe competition for planted seedlings. In either situation, prescribed burning, machine piling, mechanical scarification, or a combination of these methods may be used to prepare the site for hand planting.

Table 2-2. Acreage per age class of Simpson's ownership in the HPAs when the Plan was prepared.

HPA	Forested Land by Age Class (acres)						Non-Forest (acres)	Total
	0-20 yrs	21-40 yrs	41-60 yrs	61-80 yrs	81-100 yrs	>100 yrs		
Smith River	6,947	19,791	8,695	992	755	1,817	2,166	41,163
Coastal Klamath	20,340	46,922	11,883	362	537	4,612	2,460	87,116
Blue Creek	3,573	9,371	541	44	185	798	842	15,354
Interior Klamath	6,981	36,790	10,304	2,359	4,230	2,866	2,598	66,128
Redwood Creek	4,023	17,084	6,904	2,725	498	125	1,679	33,038
Coastal Lagoons	5,146	5,283	24,209	4,348	321	233	460	39,999
Little River	13,004	2,602	1,585	7,302	1,451	0	98	26,042
Mad River	15,193	4,517	16,028	5,218	1,718	1,156	5,668	49,497
North Fork Mad River	7,317	6,537	10,775	2,438	302	134	715	28,219
Humboldt Bay	6,798	2,995	3,895	1,699	1,572	180	326	17,465
Eel River	3,745	634	2,226	1,197	7	0	131	7,940
TOTAL	93,067	152,526	97,045	28,684	18,729	11,921	17,145	411,961

Site preparation is done as soon as possible after completion of logging so that planting will not be delayed. Mechanical site preparation may be done concurrently with logging operations. If prescribed burning is required, it is scheduled during the first spring or fall following completion of timber harvesting. Timing of such burns is predicated upon temperature, wind, humidity, and fuel moisture conditions that will result in low intensity burns. Such conditions minimize the probability of escape and allow retention of large woody debris and the finer organic matter concentrated at the soil/litter interface. Ignition patterns are used that are designed to keep fire from intruding into RMZs.

Prescribed burning is used to reduce slash concentrations or to reduce vegetative levels or control species composition. This practice involves the introduction of fire under controlled conditions to remove specified forest elements with little risk of catastrophic fire damage. Fire may be broadcast across large areas, or may be used in specific sites. Prescribed burning is also used for slash control and to reduce fuel concentrations in established stands for fire prevention.

In general, slash created by logging activity is retained on site without treatment. The California FPRs require that accidental deposits of slash within Class I and Class II watercourses be removed. Slash deposited into Class III watercourses must be removed unless it is stable within the channel. When timber harvest is accompanied by restocking (planting of young conifers) after the harvest is complete, slash is either retained untreated, mechanically cleared from small circular planting spots, or broadcast burned. In all logging areas, slash developed on log landings as a result of yarding and truck loading activities may be piled and burned on the landing.

2.4.2 Tree Planting

Tree planting generally involves hand planting nursery-grown tree seedlings directly into the soil, ensuring good contact between the soil and roots. Tree seedlings will be hand planted in even-aged management areas including landings during the first winter following completion of a THP. Planting will be postponed only if site preparation is necessary but cannot be completed prior to the planting season. The summer after initial planting, Simpson surveys planted areas to determine seedling survival rates and, where necessary to achieve desired stocking, will plant additional seedlings during the following winter. At age 2, a more detailed stocking survey will be done and, if necessary, additional trees are planted.

2.4.3 Control of Competing Vegetation

To provide successful establishment and continuing, rapid growth of desired tree species, it is often necessary to control species that compete with desired species for water and sunlight. Control methods are mechanical cutting and chipping. Simpson is not seeking coverage of herbicide use for control of competing vegetation as a part of the Permits.

2.4.4 Precommercial Thinning and Pruning

Precommercial thinning involves thinning dense young forest trees by mechanical means, including cutting individual trees or mechanically sawing or chipping rows or groups of trees. Pruning removes the lower limbs of desirable tree species to increase the eventual product value of the pruned trees. Between age 10 and 20, pre-commercial thinning may be prescribed to remedy overstocked conditions in planted stands so that crop trees will achieve optimum diameter growth. Currently, pre-commercial stems are not removed from the site because they are too small to meet current merchantable standards. This operation is performed only once in the life of a stand, and only on those stands with an excess number of trees per acre. Although chainsaws are used to cut the non-crop trees, progress in the development of feller-bunchers may eventually lead to machines that are capable of carrying out this operation more efficiently and with less risk of injury to workers. Alternatively, improvements in markets for small wood and in the machinery used to harvest small stems may allow economic harvesting of the excess trees, thus converting pre-commercial thinning to commercial thinning, as described below.

2.5 MINOR FOREST-PRODUCT HARVEST

Minor forest products include burls, stumps, boughs, and greenery. Such products are collected, harvested, and transported on Simpson timberlands. These activities will comply with the measures in Section 6.2. Permits are issued to ensure these activities are conducted in a way that protects sensitive habitats and minimizes the risks of any incidental take of Covered Species.